

04/11/01

PATENT REGISTRATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of : Andras SARCOZY, John O'BRIEN and Gregory FLYNN
Patent No. : 5,893,919
Dated : April 13, 1999
Serial no. : 08/721,090
Filed : September 27, 1996
For : APPARATUS AND METHOD FOR STORING DATA WITH SELECTABLE DATA PROTECTION USING MIRRORING AND SELECTABLE PARITY INHIBITION
Group Art Unit : 2751
Examiner : Hong Kim
Docket : STOCOM P05AUSRI

BOX REISSUE

The Commissioner of Patents and Trademarks
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Dear Sir:

By way of preliminary amendment, please amend the above identified application as set forth below.

In the Claims:

Please add claims 11-34 as follows.

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11. (NEW) In a mass storage mechanism for a system having mass storage devices for storing data wherein the system includes a host processor including memory and disk management facilities and a disk platform connected from the host processor and controlling a plurality of disk drives comprising the mass storage devices, a protection mechanism providing user selectable levels of protection against data loss, comprising:
the plurality of disk drives for storing data in data blocks in storage segments of the disk drives,
wherein

the storage segments of the disk drives are organized into at least two functionally separate logical units,

a device for receiving a user input command which designates at least one of the logical units to be mirrored, and

a memory management mechanism for controlling operations of the disk platform for writing data blocks into the disk drives,

the memory management mechanism being responsive to the designation of at least one logical unit to be mirrored, the memory management mechanism controlling operations of the disk platform so as to mirror all data blocks written into a designated logical unit to be mirrored by:

writing a first copy of a data block assigned to a first storage address in the designated logical unit into the first storage address in the designated logical unit, and

writing a second copy of the data block assigned to said first storage address in the designated logical unit into a second storage address in the disk drives, wherein

the second storage address is skewed with respect to the first storage address so that the second storage address is located in a disk drive separate from a disk drive containing the first storage address.

12. (NEW) A protection mechanism in accordance with claim 11, wherein said first copy of said data block written in the designated logical unit is protected against at least a single disk drive failure.

13. (NEW) A protection mechanism in accordance with claim 11, wherein said first copy of said data block written in the designated logical unit is protected against a single disk drive failure by a protection selected from the group consisting of striping, parity and mirroring.

14. (NEW) A protection mechanism in accordance with claim 11, wherein one of said plurality of disk drives is designated as a parity drive and wherein said first copy of said data block is protected by writing parity information associated therewith to said parity drive.

15. (NEW) A protection mechanism in accordance with claim 11, wherein said first copy of said data block is written to said disk drive containing the first storage address and wherein said first copy of said data block is protected by writing parity information associated therewith to a different one of said plurality of disk drives.

16. (NEW) A protection mechanism in accordance with claim 11, wherein said first copy of said data block is written to said first storage address in the designated logical unit, and wherein said second copy of the data block is written into said second storage address in a different one of said at least two functionally separate logical units.

17. (NEW) A mass storage system providing user selectable levels of protection against data loss, comprising:

a plurality of disk drives for storing data in data blocks in storage segments thereof, said storage segments of said disk drives being organized into at least two functionally separate logical units;

a device for receiving a user input command designating at least one of said logical units to be mirrored, and

a memory management mechanism for controlling operations of said mass storage system for writing data blocks into the disk drives, said memory management mechanism being responsive to said user input command designating at least one of said logical units to be mirrored, said memory management mechanism thereby controlling operations of said mass storage system so as to mirror all data blocks written into a designated logical unit to be mirrored by:

writing a first copy of a data block assigned to a first storage address in the designated logical unit into the first storage address in the designated logical unit, and

writing a second copy of the data block assigned to the first storage address in the designated logical unit into a second storage address in the disk drives,

wherein the second storage address is located in a disk drive separate from a disk drive containing the first storage address.

18. (NEW) A mass storage system in accordance with claim 17, wherein said first copy of said data block written in the designated logical unit is protected against at least a single disk drive failure.

19. (NEW) A mass storage system in accordance with claim 17, wherein said first copy of said data block written in the designated logical unit is protected against a single disk drive failure by a protection selected from the group consisting of striping, parity and mirroring.

20. (NEW) A mass storage system in accordance with claim 17, wherein one of said plurality of disk drives is designated as a parity drive and wherein said first copy of said data block is protected by writing parity information associated therewith to said parity drive.

21. (NEW) A mass storage system in accordance with claim 17, wherein said first copy of said data block is written to said disk drive containing the first storage address and wherein said first copy of said data block is protected by writing parity information associated therewith to a different one of said plurality of disk drives.

22. (NEW) A mass storage system in accordance with claim 17, wherein said first copy of said data block is written to said first storage address in the designated logical unit, and wherein said second copy of the data block is written into said second storage address in a different one of said at least two functionally separate logical units.

23. (NEW) In a mass storage mechanism for a system having mass storage devices for storing data wherein the system includes a host processor including memory and disk management facilities and a disk platform connected from the host processor and controlling a plurality of disk drives comprising the mass storage devices, a method for providing user selectable levels of protection against data loss, comprising the steps of:

storing the data blocks in storage segments of a plurality of disk drives, including organizing the storage segments of the disk drives into at least two functionally separate logical units for storing data wherein each logical unit includes storage segments on each one of the disk drives, receiving a user input command which designates at least one of the logical units to be mirrored, and

by operation of a memory management mechanism for controlling operations of the disk platform for writing data blocks and parity blocks into the disk drives, responsive to the designation of at least one of the logical units to be mirrored, mirroring all data blocks written into a designated logical unit by:

writing a first copy of a data block assigned to a first storage address in the designated logical unit into the first storage address in the designated logical unit, and

writing a second copy of the data block assigned to the first storage address in the designated logical unit into a second storage address in the disk drives wherein the second storage address is skewed with respect to the first storage address so that the second storage address is located in a disk drive separate from the data disk drive containing the first storage address.

24. (NEW) A method in accordance with claim 23, wherein said first copy of said data block written in the designated logical unit is protected against at least a single disk drive failure.

25. (NEW) A method in accordance with claim 23, wherein said first copy of said data block written in the designated logical unit is protected against a single disk drive failure by a protection selected from the group consisting of striping, parity and mirroring.

26. (NEW) A method in accordance with claim 23, wherein one of said plurality of disk drives is designated as a parity drive and wherein said first copy of said data block is protected by writing parity information associated therewith to said parity drive.

27. (NEW) A method in accordance with claim 23, wherein said first copy of said data block is written to said disk drive containing the first storage address and wherein said first copy of said data block is protected by writing parity information associated therewith to a different one of said plurality of disk drives.

28. (NEW) A method in accordance with claim 23, wherein said first copy of said data block is written to said first storage address in the designated logical unit, and wherein said second copy of the data block is written into said second storage address in a different one of said at least two functionally separate logical units.

29. (NEW) A method of providing user selectable levels of protection against data loss in a mass storage mechanism, comprising the steps of:

providing a plurality of disk drives for storing data thereon;

organizing the storage segments of the plurality of disk drives into at least two functionally separate logical units;

receiving a user input command which designates at least one of the logical units to be mirrored;

based on said received user input command, writing data blocks into said storage segments of said plurality of disk drives so that all data blocks written to a designated logical unit are mirrored by:

writing a first copy of a data block assigned to a first storage address in the designated logical unit into the first storage address in the designated logical unit, and writing a second copy of the data block assigned to the first storage address in the designated logical unit into a second storage address in the disk drives, wherein the second storage address is located in a disk drive separate from the disk drive containing the first storage address.

30. (NEW) A method in accordance with claim 29, wherein said first copy of said data block written in the designated logical unit is protected against at least a single disk drive failure.

31. (NEW) A method in accordance with claim 29, wherein said first copy of said data block written in the designated logical unit is protected against a single disk drive failure by a protection selected from the group consisting of striping, parity and mirroring.

32. (NEW) A method in accordance with claim 29, wherein one of said plurality of disk drives is designated as a parity drive and wherein said first copy of said data block is protected by writing parity information associated therewith to said parity drive.

33. (NEW) A method in accordance with claim 29, wherein said first copy of said data block is written to said disk drive containing the first storage address and wherein said first copy of said data block is protected by writing parity information associated therewith to a different one of said plurality of disk drives.

34. (NEW) A method in accordance with claim 29, wherein said first copy of said data block is written to said first storage address in the designated logical unit, and wherein said second copy of the data block is written into said second storage address in a different one of said at least two functionally separate logical units.

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REMARKS

Please enter the above amendments before consideration of this application.

In the event that there are any fee deficiencies or additional fees are payable, please charge the same or credit any overpayment to our Deposit Account (Account No. 04-0213).

Respectfully submitted,


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